Viability Status of Oregon Salmon and Steelhead Populations in the Willamette and Lower Columbia Basins

Part 3: Columbia River Chum

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Paul McElhany[1], Mark Chilcote[2], James Myers[1], Ray Beamesderfer[3]

[1] National Marine Fisheries Service Northwest Fisheries Science Center
[2] Oregon Department of Fish and Wildlife
[3] Cramer Fish Sciences

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I. ESU Overview and Historical Range

Based on TRT analysis, the Oregon portion of the CR chum ESU historically contained 8 populations (Figure 1). Historically, over a million chum returned in some years to the Columbia River (McElhany 2005). Recently only a few hundred to a few thousand chum have returned each year to the Columbia, mainly to the Washington side of the Columbia (McElhany 2005). The chum in Washington occur primarily in Grays River, in areas immediately below Bonneville Dam and, to a lesser extent, under the I-205 bridge near Vancouver. All of the historical Oregon side populations are considered extirpated or nearly so. Because of the near universal lack of chum in Oregon, this section on the chum ESU differs somewhat from the sections describing other ESUs in this report. Rather than a population-by-population analysis, we provide a brief description of chum abundance, spatial structure and diversity, followed by a summary of population status.

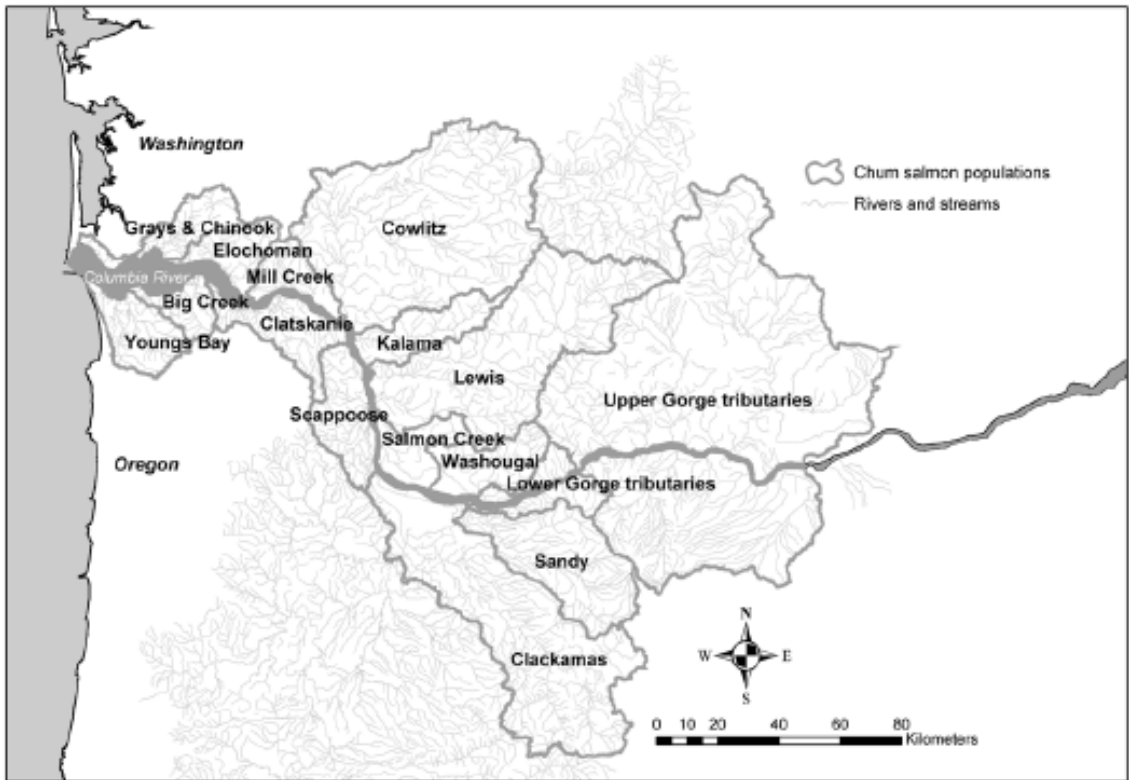

Figure 1: Map of Lower Columbia River fall chinook salmon populations.

II. Abundance and Productivity

There have been few surveys focused on Columbia chum in Oregon. However, chum are seen occasionally in Oregon and chum may be intercepted at hatchery weirs or at dam passage faculties (e.g. North Fork dam on the Clackamas River or Powerdale dam in the Hood River). In 2000, ODFW did conduct a survey focused on chum (Figure 2). Out of 30 sites surveyed, only one chum was observed (Muldoon et al. 2001).

A time series of returns is available for chum trapped at the Big Creek hatchery weir (Figure 3). Except for 2006, only a handful of fish have shown up at the facility each year and in some years no fish have appeared. It is unclear if the fish observed at the Big Creek weir were produced in Oregon or whether they are strays from the naturally producing population at Grays River across the Columbia in Washington. In 1999, a chum hatchery program was initiated in Grays River, so an unknown fraction of the fish observed in 2003-2006 are likely of hatchery origin.

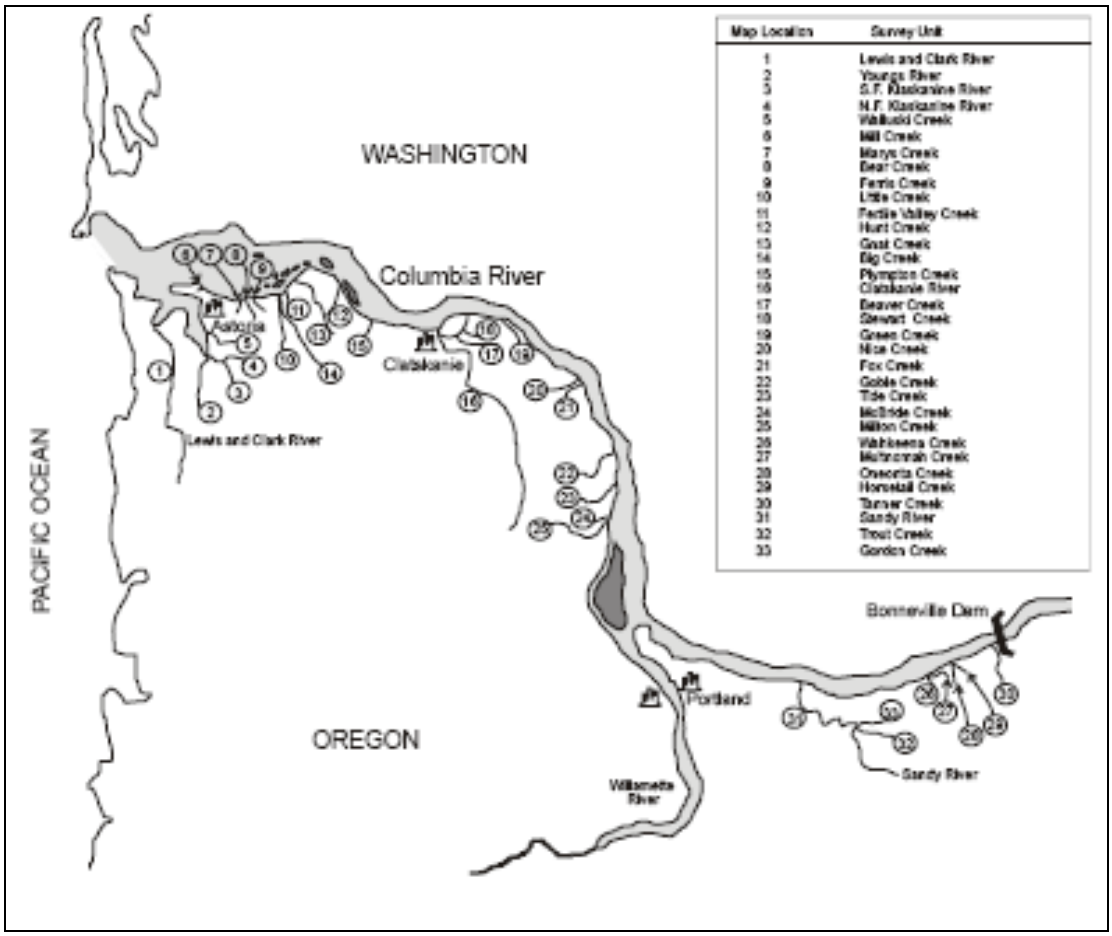

Figure 2: Locations of Oregon Department of Fish and Wildlife 2000 Columbia River stream survey sites (ODFW 2003).

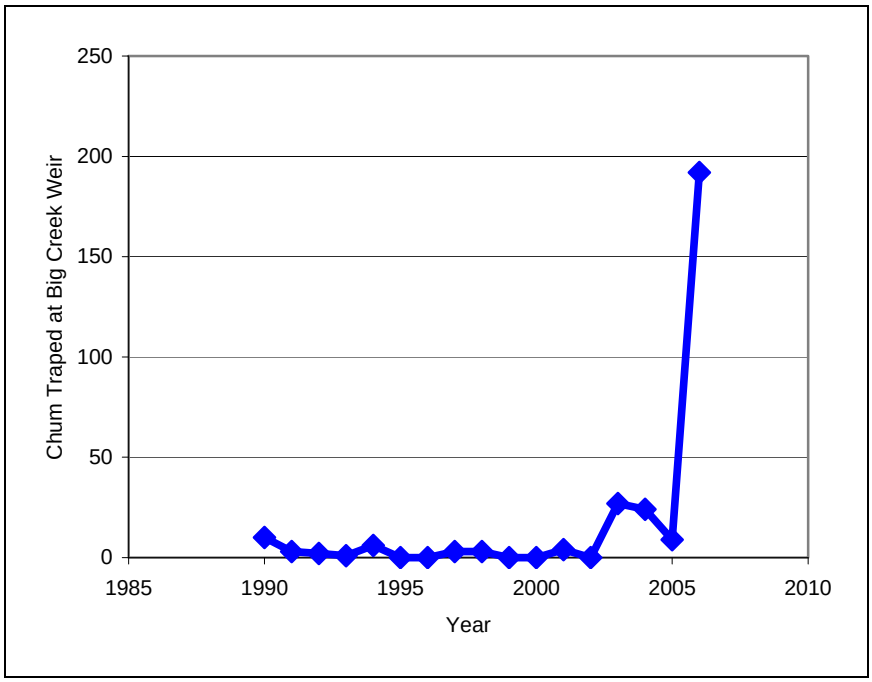

Figure 3: Chum trapped at Big Creek weir (MacIntosh, pers. com. May 15, 2007).

The Lower Columbia Gorge population spans the Columbia, with area in both Oregon and Washington. A survey of chum spawning in the lower gorge population immediately below Bonneville dam has been conducted since 1999 (Figure 4). The majority of the spawning occurs in Washington, but some spawning occurs in Oregon side in the mainstem Columbia near McCord Creek (Figure 5) and Multnomah Falls. These are currently the only documented locations in Oregon with chum redds over multiple years of which we are aware. In 2005, 33 live adult chum were observed in the Multnomah Falls area (Fish Passage Center).

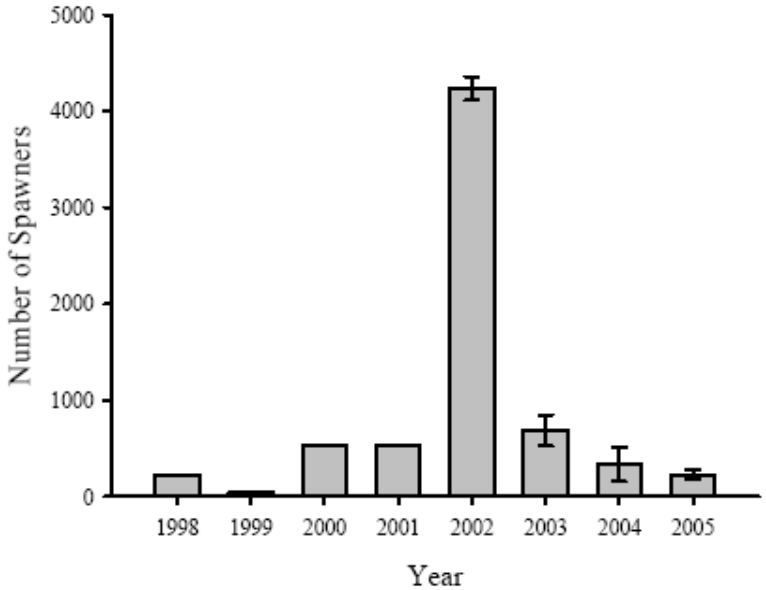

Figure 4: Estimated chum salmon spawner abundance in the Pierce/Ives Island complex below Bonneville Dam (Tomaro et al. 2007).

Figure 5: Chum salmon redd locations below Bonneville Dam in 2005 (Tomaro et al. 2007).

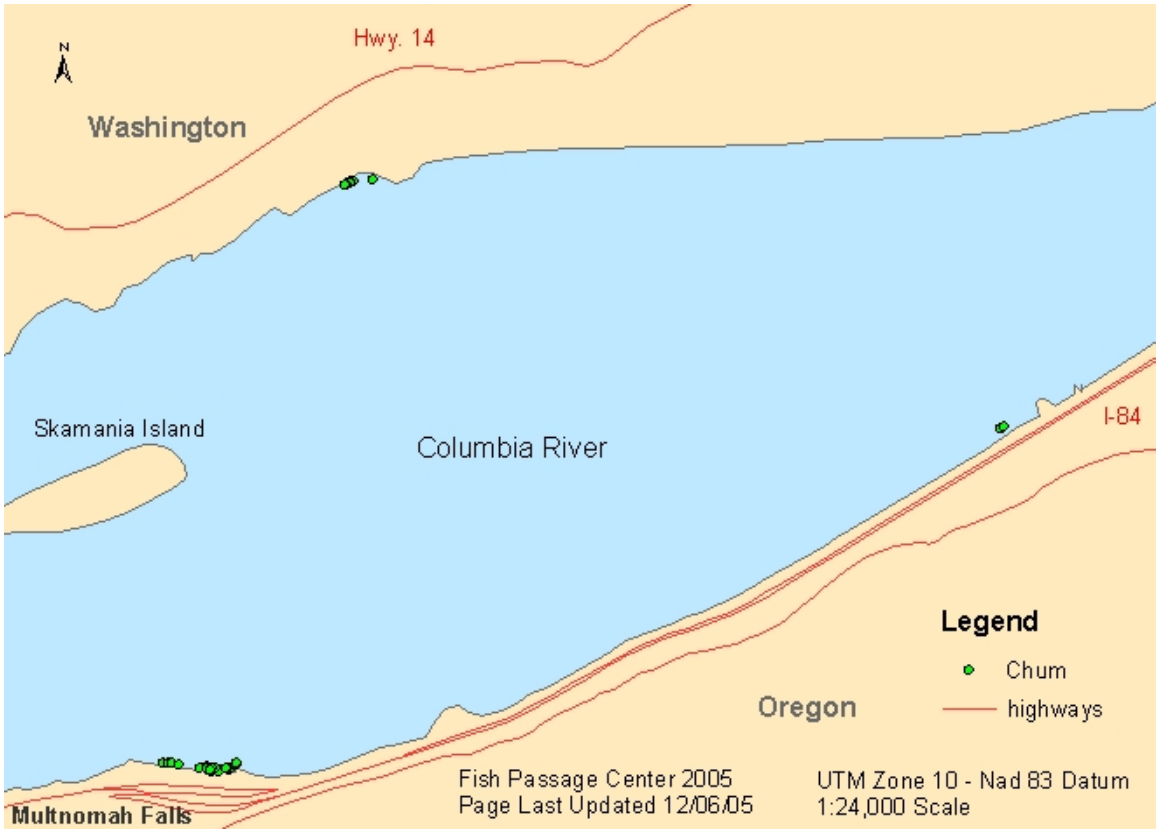

Figure 6: Chum salmon redd locations near Multnomah Falls in 2005 (from Fish Passage Center).

There was historically a chum population between what is now the Bonneville Dam and Celillo Falls (now The Dalles dam). In most years, chum salmon are observed in the ladders at Bonneville Dam (Figure 7). It is not know whether these fish successfully spawn above the dam and if so, what fraction spawn on the Oregon side of the Columbia River. These fish may be strays from the below-Bonneville area that do not successfully spawn above Bonneville. Some fraction may also fall back over Bonneville Dam.

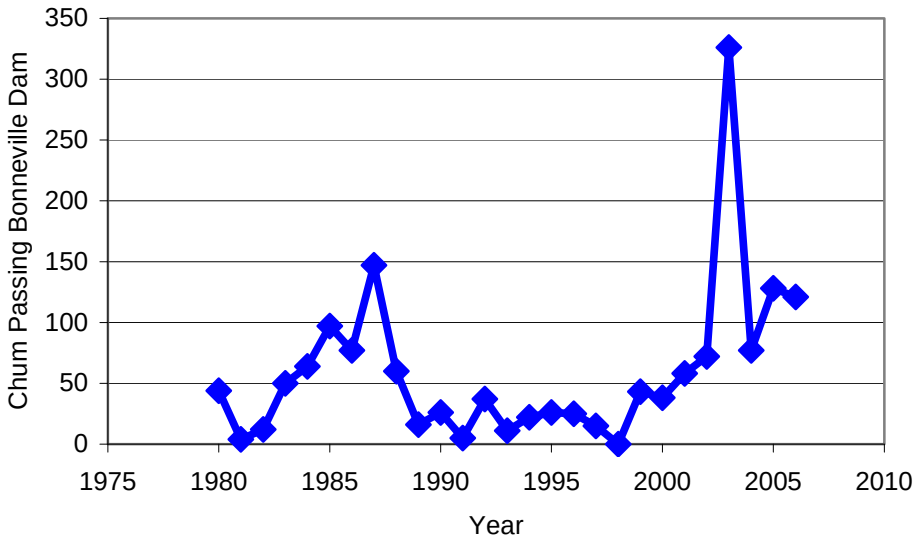

Figure 7: Counts of chum salmon passing Bonneville Dam (Fish Passage Center database http://www.fpc.org/fpc_homepage.html).

III. Spatial Structure

Our knowledge of historical CR chum spatial distribution is incomplete. Chum primarily spawned in the Columbia mainstem and lower tributary reaches and seem to prefer microhabitats with hyporeic flow (Rawding, pers. com.). Maps of current and historical accessibility for chum are available (Maher et al. 2005), but they do not consider microhabitat needs and they do not explore habitat quality. Much of the human population in the region lives in the low elevation, low gradient environment historically used by chum, so we suspect there has been substantial impact on potential spatial structure for chum. Since there are currently few, if any, chum in many of the historical populations, understanding potential spatial structure is important for recovery planning, but is not really necessary for an accurate assessment of population viability.

IV. Diversity

With so few fish, Oregon chum populations have undergone a significant population bottleneck, with likely genetic consequences. Until recently, there have been few hatchery origin chum in the Columbia. In 1999, a hatchery program was initiated in Grays River (McElhany 2005). Fish from this program may stray into Oregon, with potential domestication effects. Give the population bottleneck, maintaining (or establishing) appropriate diversity will likely be a concern when considering how to recovery CR chum populations.

V. Summary

A few chum show up at fish counting facilities and it is likely that some low level, intermittent spawning of chum has gone undetected in Oregon streams. Recent genetic analysis of Washington chum suggests that very small remnant populations may have persisted in the Lower Columbia even when there have been no consistent observations of fish (Small et al. 2006). However, it is clear that all of the Oregon chum populations are in the very high risk category (i.e., extirpated or nearly so). We therefore conclude that the Oregon portion of the CR chum ESU is also at very high risk of extinction.

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